Space Weather Forecast

Issued on Friday 7 February 2025 at 13:03 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate flares expected, chance of Strong flares. Chance of radiation storms. Minor geomagnetic storm likely Day 3 (09 Feb).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate with four Moderate-class flares, the largest occurring at 07/0921 UTC, from the cluster in the northwest.

There are now ten active regions on the Earth-facing disc. The majority of interest is in the northwest quadrant, with a cluster of entwined regions. Of these, there is one larger region with significant magnetic complexity and recent development of the intermediate spots. The other regions within this cluster are close together and it is difficult to define the exact boundaries of each region. As such they are magnetically interconnected, with interaction between the various regions. The remaining regions on the disc are small and simple at the present time.

A faint Coronal Mass Ejection (CME) is visible in some coronagraph imagery from the M7.5 flare. This is still under analysis, but an Earth directed component is possible.

Solar Wind / Geomagnetic Activity: Solar winds showed a coronal hole fast wind type signature, perhaps with some limited CME influence. Wind speeds were initially elevated near 500 km/s, declining gradually to slightly elevated levels around 400 km/s. The Interplanetary Magnetic Field was weak to moderate, with the north-south component varying weakly but predominantly northward directed. Geomagnetic activity was Quiet to Unsettled (Kp 1-3).

Energetic Particles / Solar Radiation: High energy proton flux remained at background levels.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is expected to continue, with a chance of a strong flare, primarily from the cluster of regions in the northwest.

Solar Wind / Geomagnetic Activity: Two CMEs have a low chance of giving some influence at Earth, the first late Day 1 into Day 2 (07-08 Feb) and the other late on Day 4 (10 Feb). Both are low confidence. A further CME may have emerged following the recent flares from the NW on 07 Feb, but this is still under analysis. A coronal hole fast wind is expected to arrive during Day 3 (09 Feb), perhaps more likely during the second half of the day, potentially bringing speeds of 500-600 km/s

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Predominantly Quiet to Unsettled (Kp 0-3) geomagnetic activity is expected, with a slight chance of Active to G1/Minor Storm intervals if we do see any CME influence late Day 1 into Day 2. Activity is then expected to increase again during Days 3-4 due to the fast wind from CH13, perhaps with some limited CME influence, becoming Unsettled to G1/Minor storm (Kp 3-5) with a slight chance of G2/Moderate storm intervals.

Energetic Particles / Solar Radiation: There is a chance of energetic particles rising above the S1/Minor radiation storm threshold as the cluster of sunspots in the northwest are now in a good position to connect with Earth, should there be further large flares.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	10	60	50
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	Yes	80	80	80	80
Very Active	R3-R5 (X Class)	No	25	25	25	25

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	25	25	25	25
Very Active	**≥ S3 ***	No	5	5	5	5
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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